

### 3.9 Nonstructural Checklists

The following checklists are included in this Section:

- Basic Nonstructural Component Checklist, and
- Supplemental Nonstructural Component Checklist.

These checklists shall be completed when required by Table 3-2. The Basic Nonstructural Component Checklist shall be completed prior to completing the Supplemental Nonstructural Component Checklist.

### 3.9.1 Basic Nonstructural Component Checklist

This Basic Nonstructural Component Checklist shall be completed when required by Table 3-2.

Each of the evaluation statements on this checklist shall be marked compliant (C), non-compliant (NC), or not applicable (N/A) for a Tier 1 Evaluation. Compliant statements identify issues that are acceptable according to the criteria of this Handbook, while non-compliant statements identify issues that require further investigation. Certain statements may not apply to the buildings being evaluated. For non-compliant evaluation statements, the design professional may choose to conduct further investigation using the corresponding Tier 2 evaluation procedure; the section numbers in parentheses following each evaluation statement correspond to Tier 2 evaluation procedures.

#### Partitions

C	NC	N/A	UNREINFORCED MASONRY: Unreinforced masonry or hollow clay tile partitions shall be braced at a spacing of equal to or less than 10 feet in regions of low and moderate seismicity and 6 feet in regions of high seismicity. (Tier 2: Sec. 4.8.1.1)
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#### Ceiling Systems

C	NC	N/A	INTEGRATED CEILINGS: Integrated suspended ceilings at exits and corridors or weighing more than 2 lb/ft <sup>2</sup> shall be laterally restrained with a minimum of 4 diagonal wires or rigid members attached to the structure above at a spacing of equal to or less than 12 ft. (Tier 2: Sec. 4.8.2.1)
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C	NC	N/A	LAY-IN TILES: Lay-in tiles used in ceiling panels located at exitways and corridors shall be secured with clips. (Tier 2: Sec. 4.8.2.2)
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C	NC	N/A	SUPPORT: The integrated suspended ceiling system shall not be used to laterally support the tops of gypsum board, masonry, or hollow clay tile partitions. (Tier 2: Sec. 4.8.2.3)
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C	NC	N/A	SUSPENDED LATH AND PLASTER: Ceilings consisting of suspended lath and plaster or gypsum board shall be attached for each 10 square feet of area. (Tier 2: Sec. 4.8.2.4)
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#### Light Fixtures

C	NC	N/A	INDEPENDENT SUPPORT: Light fixtures in suspended grid ceilings shall be supported independently of the ceiling suspension system by a minimum of two wires at diagonally opposite corners of the fixtures. (Tier 2: Sec. 4.8.3.1)
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C	NC	N/A	EMERGENCY LIGHTING: Emergency lighting shall be anchored or braced to prevent falling or swaying during an earthquake. (Tier 2: Sec. 4.8.3.2)
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#### Cladding and Glazing

C	NC	N/A	CLADDING ANCHORS: Cladding components weighing more than 10 psf shall be anchored to the exterior wall framing at a spacing equal to or less than 6 ft. for Life Safety and 4 ft. for Immediate Occupancy. (Tier 2: Sec. 4.8.4.1)
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C	NC	N/A	CLADDING ISOLATION: For moment frame buildings of steel or concrete, panel connections shall be detailed to accommodate a drift ratio of 0.02 for Life Safety and 0.01 for Immediate Occupancy. (Tier 2: Sec. 4.8.4.2)
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C	NC	N/A	MULTISTORY PANELS: For multistory panels attached at each floor level, the panels and connections shall be able to accommodate a drift ratio of 0.02 for Life Safety and 0.01 for Immediate Occupancy. (Tier 2: Sec. 4.8.4.3)
C	NC	N/A	BEARING CONNECTIONS: Where bearing connections are required, there shall be a minimum of two bearing connections for each wall panel.(Tier 2: Sec. 4.8.4.4)
C	NC	N/A	INSERTS: Where inserts are used in concrete connections, the inserts shall be anchored to reinforcing steel. (Tier 2: Sec. 4.8.4.5)
C	NC	N/A	PANEL CONNECTIONS: Exterior cladding panels shall be anchored with a minimum of 2 connections for each wall panel for Life Safety and 4 connections for Immediate Occupancy. (Tier 2: Sec. 4.8.4.6)
C	NC	N/A	DETERIORATION: There shall be no evidence of deterioration or corroding in any of the connection elements. (Tier 2: Sec. 4.8.4.7)
C	NC	N/A	DAMAGE: There shall be no damage to exterior wall cladding. (Tier 2: Sec. 4.8.4.8)
C	NC	N/A	GLAZING: Glazing in curtain walls and individual panes over 16 square feet in area, located up to a height of 10 feet above an exterior walking surface, shall be laminated annealed or heat strengthened safety glass that will remain in the frame when cracked.(Tier 2: Sec. 4.8.4.9)

#### Masonry Veneer

C	NC	N/A	SHELF ANGLES: Masonry veneer shall be supported by shelf angles or other elements at each floor above the first floor. (Tier 2: Sec. 4.8.5.1)
C	NC	N/A	TIES: Masonry veneer shall be connected to the back-up with corrosion-resistant ties. The ties shall have a spacing of equal to or less than 36" for Life Safety and 24" for Immediate Occupancy with a minimum of one tie for every 2-2/3 square feet. (Tier 2: Sec. 4.8.5.2)
C	NC	N/A	WEAKENED PLANES: Masonry veneer shall be anchored to the back-up at locations of flashing. (Tier 2: Sec. 4.8.5.3)

#### Parapets, Cornices, Ornamentation and Appendages

C	NC	N/A	URM PARAPETS: There shall be no laterally unsupported unreinforced masonry parapets or cornices above the highest anchorage level with height-to-thickness ratios greater than 1.5 in regions of high seismicity and 2.5 in regions of moderate or low seismicity. (Tier 2: Sec. 4.8.8.1)
C	NC	N/A	CANOPIES: Canopies located at building exits shall be anchored at a spacing 10 feet for Life Safety and 6 feet for Immediate Occupancy. (Tier 2: Sec. 4.8.8.2)

## Chapter 3.0 - Screening Phase (Tier 1)

### Masonry Chimneys

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|---|----|-----|---|
| C | NC | N/A | URM: No unreinforced masonry chimney shall extend above the roof surface more than twice the least dimension of the chimney. (Tier 2: Sec. 4.8.9.1) |
| C | NC | N/A | MASONRY: Masonry chimneys shall be anchored to the floor and roof. (Tier 2: Sec. 4.8.9.2)   |

### Stairs

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|---|----|-----|---|
| C | NC | N/A | URM WALLS: Walls around stair enclosures shall not consist of unbraced hollow clay tile or unreinforced masonry. (Tier 2: Sec. 4.8.10.1)  |
| C | NC | N/A | STAIR DETAILS: In moment frame structures, the connection between the stairs and the structure shall not rely on shallow anchors in concrete. Alternatively, the stair details shall be capable of accommodating the drift calculated using the Quick Check Procedure of Section 3.5.3.1 without inducing tension in the anchors. (Tier 2: Sec. 4.8.10.2) |

### Building Contents and Furnishing

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|---|----|-----|---|
| C | NC | N/A | TALL NARROW CONTENTS: Contents with a height-to-depth ratio greater than 3 for Immediate Occupancy and 4 for Life Safety shall be anchored to the floor slab or adjacent walls. (Tier 2: Sec. 4.8.11.1) |
|---|----|-----|---|

### Mechanical and Electrical Equipment

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|---|----|-----|--|
| C | NC | N/A | EMERGENCY POWER: Equipment used as part of an emergency power system shall be mounted to maintain continued operation after an earthquake. (Tier 2: Sec. 4.8.12.1)         |
| C | NC | N/A | HEAVY EQUIPMENT: Equipment weighing over 20 lb that is attached to ceilings, walls, or other supports 4 ft. above the floor level shall be braced. (Tier 2: Sec. 4.8.12.2) |

### Piping

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|---|----|-----|--|
| C | NC | N/A | FIRE SUPPRESSION PIPING: Fire suppression piping shall be anchored and braced in accordance with <i>NFPA-13</i> (NFPA, 1996). This statement need not be evaluated for buildings in regions of moderate seismicity being evaluated to the Life Safety Performance Level(Tier 2: Sec. 4.8.13.1) |
| C | NC | N/A | FLEXIBLE COUPLINGS: Fluid, gas and fire suppression piping shall have flexible couplings. This statement need not be evaluated for buildings in regions of moderate seismicity being evaluated to the Life Safety Performance Level(Tier 2: Sec. 4.8.13.2)                                     |

### Hazardous Materials Storage and Distribution

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|---|----|-----|---|
| C | NC | N/A | TOXIC SUBSTANCES: Toxic and hazardous substances stored in breakable containers shall be restrained from falling by latched doors, shelf lips, wires, or other methods. (Tier 2: Sec. 4.8.15.1) |
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### 3.9.1S Supplemental Nonstructural Component Checklist

This Supplemental Nonstructural Component Checklist shall be completed when required by Table 3-2. The Basic Nonstructural Component Checklist shall be completed prior to completing this Supplemental Nonstructural Component Checklist.

#### Partitions

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|---|----|-----|---|
| C | NC | N/A | DRIFT: The drift ratio for masonry partitions shall be limited to 0.005. (Tier 2: Sec. 4.8.1.2)   |
| C | NC | N/A | STRUCTURAL SEPARATIONS: Partitions at structural separations shall have seismic or control joints. (Tier 2: Sec. 4.8.1.3)   |
| C | NC | N/A | TOPS: The tops of framed or panelized partitions that only extend to the ceiling line shall have lateral bracing to the building structure at a spacing of equal to or less than 6 feet. (Tier 2: Sec. 4.8.1.4) |

#### Ceiling Systems

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|---|----|-----|--|
| C | NC | N/A | EDGES: The edges of integrated suspended ceilings shall be separated from enclosing walls by a minimum of 1/2". (Tier 2: Sec. 4.8.2.5) |
| C | NC | N/A | SEISMIC JOINT: The ceiling system shall not extend continuously across any seismic joint. (Tier 2: Sec. 4.8.2.6)                       |

#### Light Fixtures

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|---|----|-----|--|
| C | NC | N/A | PENDANT SUPPORTS: Light fixtures on pendant supports shall be attached at a spacing of equal to or less than 6 ft. and, if rigidly supported, shall be free to move without damaging adjoining materials. (Tier 2: Sec. 4.8.3.3) |
| C | NC | N/A | LENS COVERS: Lens covers on fluorescent light fixtures shall be attached or supplied with safety devices. (Tier 2: Sec. 4.8.3.4)   |

#### Masonry Veneer

- |   |    |     |  |
|---|----|-----|--|
| C | NC | N/A | MORTAR: The mortar in masonry veneer shall not be easily scraped away from the joints by hand with a metal tool, and there shall not be significant areas of eroded mortar. (Tier 2: Sec. 4.8.5.4) |
| C | NC | N/A | WEEP HOLES: Weep holes shall be present and base flashing shall be installed. (Tier 2: Sec. 4.8.5.5)   |
| C | NC | N/A | CORROSION: Corrosion of veneer ties, tie screws, studs, and stud tracks shall be minimal. (Tier 2: Sec. 4.8.5.6)   |
| C | NC | N/A | STONE PANELS: Stone panels less than 2 inches nominal thickness shall be anchored every 2 square feet of area. (Tier 2: Sec. 4.8.5.7)  |
| C | NC | N/A | CRACKS: There shall no be visible cracks or weak veins in the stone. (Tier 2: Sec. 4.8.5.8)  |

## Chapter 3.0 - Screening Phase (Tier 1)

### Metal Stud Back-Up Systems

**C NC N/A** STUD TRACKS: Stud tracks shall be fastened to structural walls or floors at a spacing of equal to or less than 24 inches. (Tier 2: Sec. 4.8.6.1)

**C NC N/A** OPENINGS: Additional steel studs shall frame window and door openings. (Tier 2: Sec. 4.8.6.2)

### Concrete Block and Masonry Back-Up Systems

**C NC N/A** CONCRETE BLOCK: Concrete block shall qualify as reinforced masonry. (Tier 2: Sec. 4.8.7.1)

**C NC N/A** BACK-UP: Concrete block back-up shall be anchored to the structural frame at a spacing of equal to or less than 4 feet along the floors and roof. (Tier 2: Sec. 4.8.7.2)

**C NC N/A** URM BACK-UP: There shall not be any unreinforced masonry back-up. (Tier 2: Sec. 4.8.7.3)

### Parapets, Cornices, Ornamentation and Appendages

**C NC N/A** CONCRETE PARAPETS: Concrete parapets with height-to-thickness ratios greater than 2.5 shall have vertical reinforcement. (Tier 2: Sec. 4.8.8.3)

**C NC N/A** APPENDAGES: Cornices, parapets, signs, and other appendages that extend above the highest anchorage level or cantilever from exterior wall faces and other exterior wall ornamentation shall be reinforced and anchored to the structural system at a spacing of equal to or less than 10 ft. for Life Safety and 6 ft. for Immediate Occupancy. (Tier 2: Sec. 4.8.8.4)

### Building Contents and Furnishing

**C NC N/A** FILE CABINETS: File cabinets arranged in groups shall be attached to one another (Tier 2: Sec. 4.8.11.2)

**C NC N/A** DRAWERS: Cabinet drawers shall have latches to keep them closed during an earthquake. (Tier 2: Sec. 4.8.11.3)

**C NC N/A** COMPUTER ACCESS FLOORS: Computer access floors shall be braced (Tier 2: Sec. 4.8.11.4)

**C NC N/A** ACCESS FLOORS: Equipment supported on access floor systems shall be either attached to the structure or fastened to a laterally braced floor system. (Tier 2: Sec. 4.8.11.5)

### Mechanical and Electrical Equipment

**C NC N/A** HEAVY EQUIPMENT: Equipment weighing over 100 lb. shall be anchored to the structure or foundation. (Tier 2: Sec. 4.8.12.3)

**C NC N/A** VIBRATION ISOLATORS: Equipment mounted on vibration isolators shall be equipped with restraints or snubbers. (Tier 2: Sec. 4.8.12.4)

**C NC N/A** ELECTRICAL EQUIPMENT: Electrical equipment shall be attached to the structural system. (Tier 2: Sec. 4.8.12.5)

## Chapter 3.0 - Screening Phase (Tier 1)

### Piping

- |   |    |     |  |
|---|----|-----|--|
| C | NC | N/A | FLUID AND GAS PIPING: Fluid and gas piping shall be anchored and braced to the structure in accordance with SP-58 (MSS, 1993). (Tier 2: Sec. 4.8.13.3)   |
| C | NC | N/A | SHUT-OFF VALVES: Shut-off devices shall be present at building utility interfaces to shut off the flow of gas and high temperature energy in the event of earthquake-induced failure (Tier 2: Sec. 4.8.13.4) |
| C | NC | N/A | C-CLAMPS: One-sided C-clamps that support major piping shall not be unrestrained. (Tier 2: Sec. 4.8.13.5)  |

### Ducts

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|---|----|-----|--|
| C | NC | N/A | DUCT BRACING: Rectangular ductwork exceeding 6 square feet in cross-sectional area, and round ducts exceeding 28" in diameter shall be braced. Maximum transverse bracing shall not exceed 40 feet for Life Safety and 30 feet for Immediate Occupancy. Maximum longitudinal bracing shall not exceed 80 feet for Life Safety and 60 feet for Immediate Occupancy. Intermediate supports shall not be considered part of the lateral-force-resisting system. (Tier 2: Sec. 4.8.14.1) |
| C | NC | N/A | STAIR AND SMOKE DUCTS: Stair pressurization and smoke flow of gas and high temperature energy in the event of earthquake-induced failure. (Tier 2: Sec. 4.8.13.4)  |
| C | NC | N/A | DUCT SUPPORT: Ducts shall not be supported by piping or other nonstructural elements. (Tier 2: Sec. 4.8.14.3)  |

### Hazardous Materials Storage and Distribution

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|---|----|-----|--|
| C | NC | N/A | GAS CYLINDERS: Compressed gas cylinders shall be restrained. (Tier 2: Sec. 4.8.15.2)   |
| C | NC | N/A | HAZARDOUS MATERIALS: Piping containing hazardous materials shall have shut-off valves or other devices to prevent major spills or leaks. (Tier 2: Sec. 4.8.15.3) |



### Chapter 3.0 - Screening Phase (Tier 1)

#### Elevators

C	NC	N/A	SUPPORT SYSTEM: All elements of the elevator system shall be anchored (Tier 2: Sec. 4.8.16.1)
C	NC	N/A	SEISMIC SWITCH: All elevators shall be equipped with seismic switches that will terminate operations when the ground motion exceeds 0.10g. (Tier 2: Sec. 4.8.16.2)
C	NC	N/A	SHAFT WALLS: All elevator shaft walls shall be anchored and reinforced to prevent toppling into the shaft during strong shaking. (Tier 2: Sec. 4.8.16.3)
C	NC	N/A	RETAINER GUARDS: Cable retainer guards on sheaves and drums shall be present to inhibit the displacement of cables. (Tier 2: Sec. 4.8.16.4)
C	NC	N/A	RETAINER PLATE: A retainer plate shall be present at the top and bottom of both car and counterweight. (Tier 2: Sec. 4.8.16.5)
C	NC	N/A	COUNTERWEIGHT RAILS: All counterweight rails shall be sized to current industry standards and shall be larger than eight-pound rails. (Tier 2: Sec. 4.8.16.6)
C	NC	N/A	BRACKETS: The brackets that tie the counterweight rail to the building structure shall be sized to meet industry standards and shall have a spacing of 8 feet or less (Tier 2: Sec. 4.8.16.7)
C	NC	N/A	SPREADER BRACKET: Spreader brackets shall not be used to resist seismic forces (Tier 2: Sec. 4.8.16.8)